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(54) **KEYBOARD AND METHOD OF SELECTING COLORS OF KEYS OF THE KEYBOARD**

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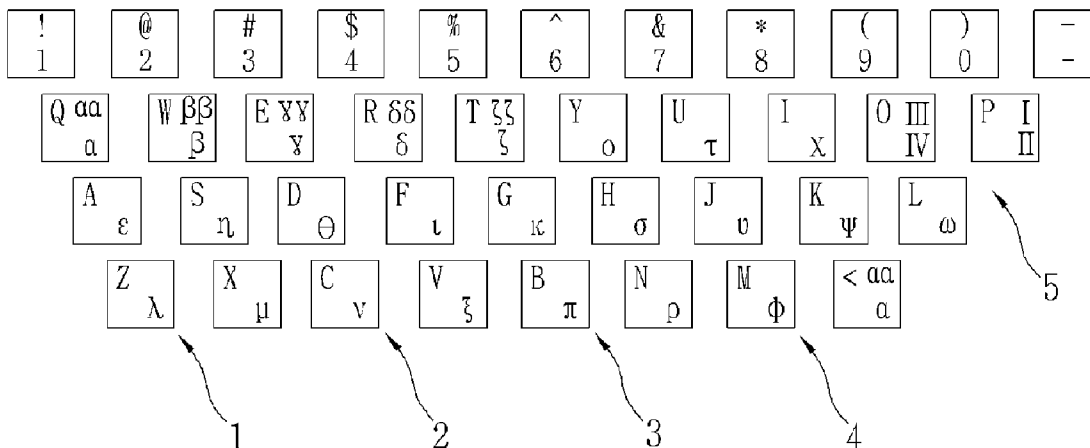**ST. LOUIS, MO 63105 (US)**

(57) **ABSTRACT**

The present invention discloses a keyboard comprising light emitting devices, each respectively disposed below a key to lighten the top surface of the key; and a micro controller unit transmitting signals generated by each key to the computer, having switches for controlling the light emitting devices, and controlling switches according to signals transmitted from the computer, and a method of selecting the colors of the keys of the same.
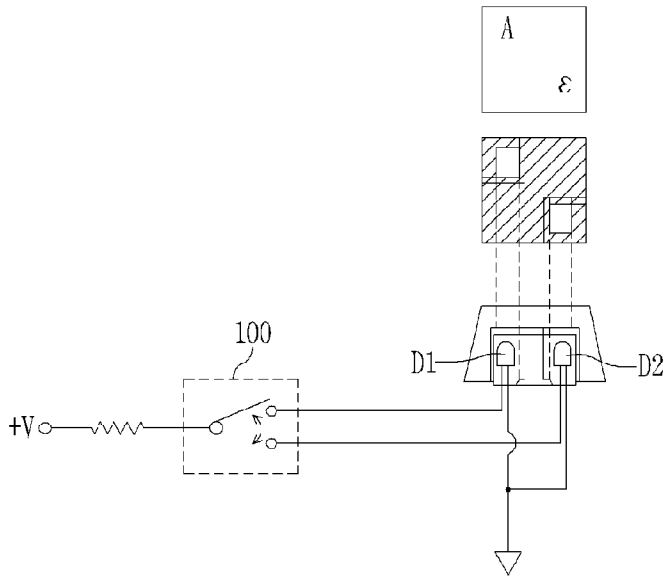
[Fig. 1]

[Fig. 2]

[Fig. 3]

[Fig. 4]

73   71

| Key color selection mode | | | _ □ ✕ |

File (F), Edit (E), View (V), Tool (T), Help (H)

| ! 1 | @ 2 | # 3 | $ 4 | % 5 | ^ 6 | & 7 | * 8 | (9 |) 0 | _ - |

| Q αα α | W ββ β | E ɣɣ ɣ | R δδ δ | T ζζ ζ | Y ο | U τ | I χ | O Ⅲ ⅣⅣ | P ∏ |

| A ε | S η | D θ | F ι | G κ | H σ | J υ | K ψ | L ω |

| Z λ | X μ | C ν | V ξ | B π | N ρ | M φ | < αα α |

72

[Fig. 5]

80		90
201	81	82	91	92	20
Input device	Driving program	CPU	MCU		GND R₁ G₁ R₁ ... GND Rₙ Gₙ Rₙ

[Fig. 6]

```
                    ┌──────────┐
                    │  Start   │
                    └──────────┘
                          │
                          ▼ ◄────────────────────┐
                        ╱   ╲                     │
                      ╱       ╲      no           │
                    ◄  Request? ────────────────►─┘
                      ╲       ╱
                        ╲   ╱  ──S1
                          │ yes
                          ▼
        ┌─────────────────────────────────────┐
        │  Display screen for selection  ──S2 │
        └─────────────────────────────────────┘
                          │
                          ▼ ◄────────────────────┐
        ┌─────────────────────────────────────┐ │
        │       Select colors          ──S3   │ │
        └─────────────────────────────────────┘ │
                          │                      │
                          ▼                      │
                        ╱   ╲                    │
                      ╱       ╲     no           │
                    ◄ Completed? ──────────────►─┘
                      ╲       ╱
                        ╲   ╱  S4
                          │ yes
                          ▼
                    ┌──────────┐
                    │   End    │
                    └──────────┘
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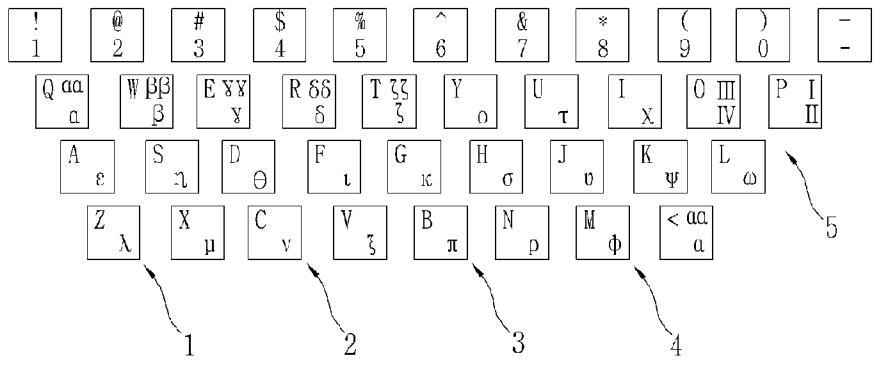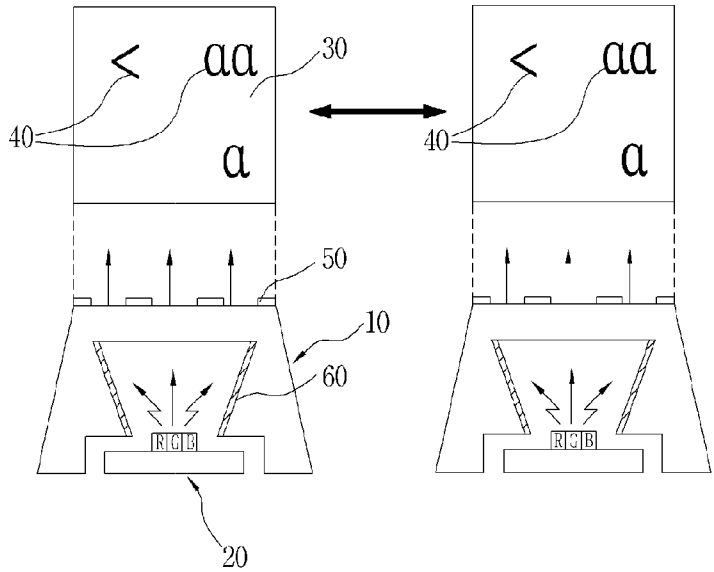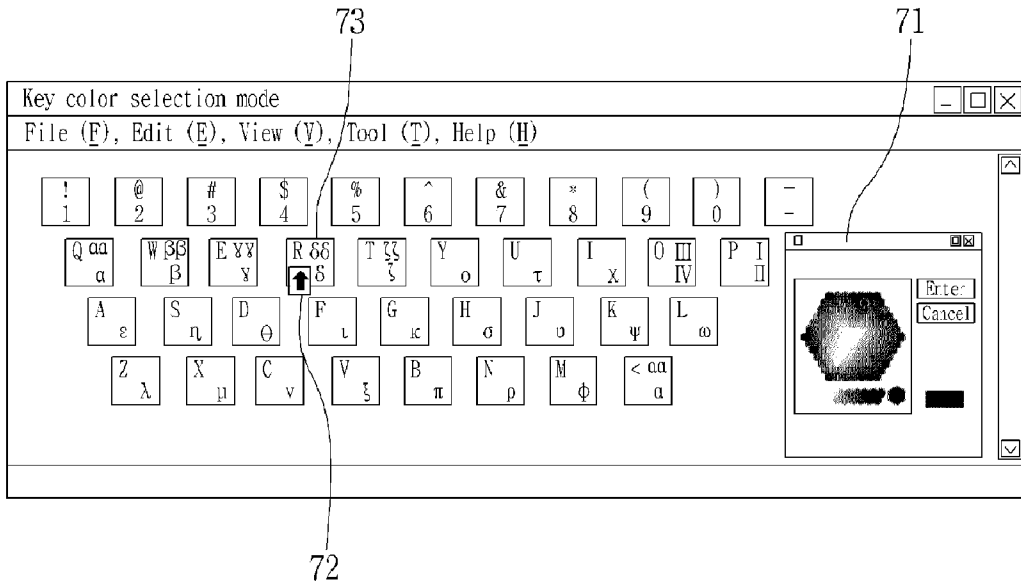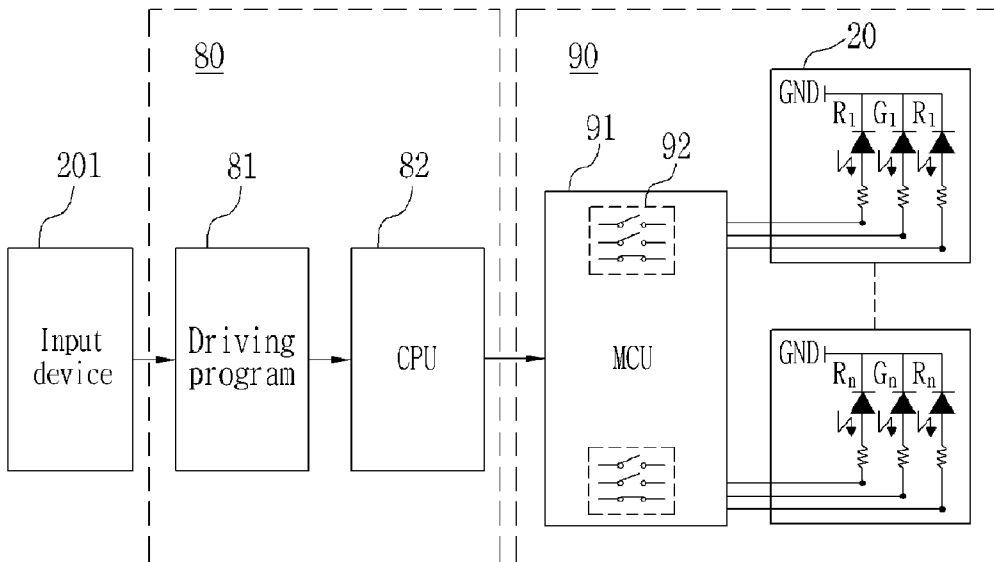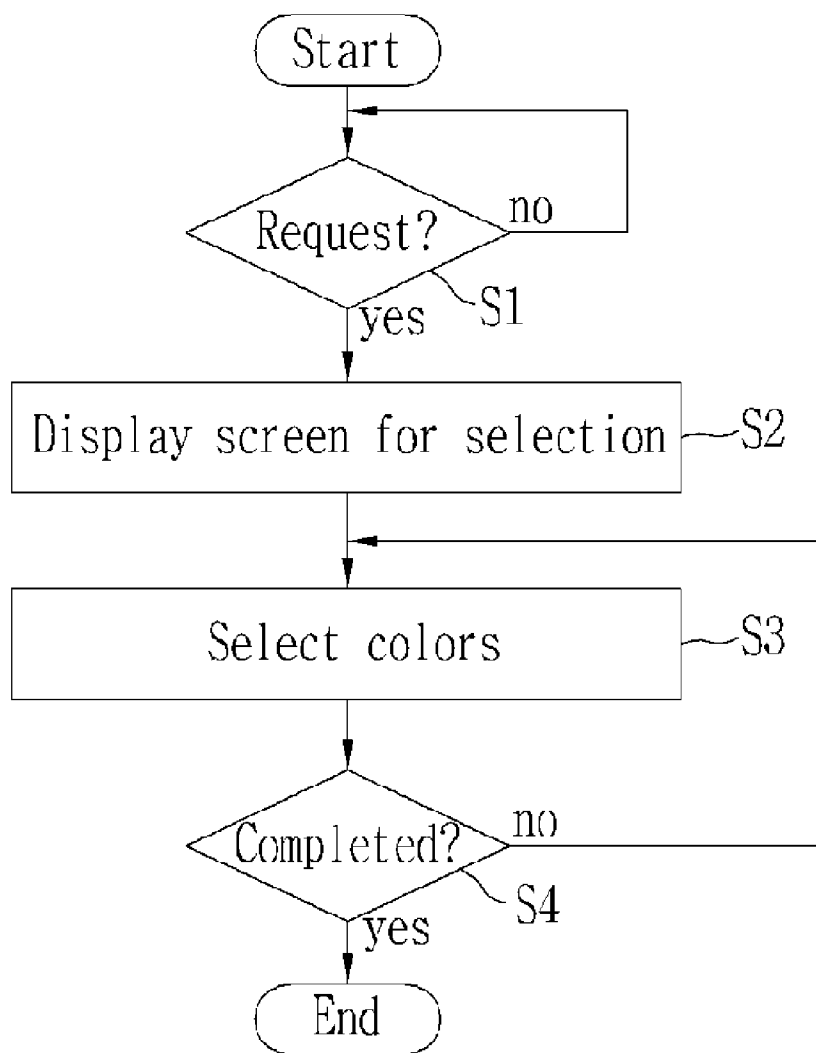
KEYBOARD AND METHOD OF SELECTING COLORS OF KEYS OF THE KEYBOARD

TECHNICAL FIELD

[0001] The present invention relates to a keyboard and a method of selecting colors of keys of the same, and more particularly, to a keyboard and a method of selecting colors of keys of the same by a software operation.

BACKGROUND ART

[0002] A keyboard of a computer has about 100 keys. In the conventional art, light emitting diodes (LED) are installed below the keys so that the keys can attract attention or can be used in a dark space.

[0003] FIG. 1 illustrates an apparatus for selectively displaying characters of a keyboard disclosed under Korean Patent Registration Official Gazette 10-0222374. LEDs D1 and D2 are disposed below an English character 'A' and a Korean character 'mi-um' (but it is illustrated as a Greek character 'ε' in FIG. 1 for PCT publication). The LED D1 or D2 lightens the English character 'A' or the Korean character 'mi-um' by an operation of a switch 100, thereby showing the current state of the keyboard.

[0004] However, this technology relates to lightening English characters or Korean characters of the keys by the LED D1 or D2, just using a Korean/English conversion key which controls the switch 100.

DISCLOSURE OF INVENTION

Technical Problem

[0005] The present invention is achieved to solve the above problems. An object of the present invention is to provide a keyboard which allows the user to select colors of keys by software mounted on a computer, and a method thereof.

[0006] Another object of the present invention is to provide a keyboard which can obtain various colors by using RGB (red, green and blue) LEDs, and a method of selecting the colors of the keys of the same.

Technical Solution

[0007] In order to achieve the above-described objects of the invention, there is provided a keyboard being connected to a computer as an input means and including a plurality of keys each respectively including a symbol region on its top surface, the keyboard including: light emitting devices each respectively disposed below a key to lighten the top surface of the key; and a micro controller unit transmitting signals generated by each key to the computer, having switches for controlling the light emitting devices, and controlling the switches according to signals transmitted from the computer.

[0008] Differently from a general micro controller unit, the micro controller unit does not control the light emitting devices by the operation of a special key of the keyboard, but controls the built-in switches operated by using the colors processed by software mounted on the computer and information on the designated keys. Therefore, the light emitting devices can respectively lighten keys with the designated color or colors.

[0009] There is also provided a method of selecting colors of keys of a keyboard, the keyboard being connected to a computer as an input means, and including a plurality of keys each respectively including a symbol region on its top sur-face, light emitting devices each respectively disposed below a key to lighten the top surface of the key, and a micro controller unit having switches for controlling the light emitting devices, the method including: a first step for receiving a request of selecting the colors of the keys of the keyboard from an input device; a second step for displaying a screen on a monitor for key selection and color selection of the selected key; a third step for receiving information on the color-selected key from the input device; and a fourth step for transmitting the information to the micro controller unit of the keyboard.

[0010] Preferably, the method further includes a fifth step for controlling, at the micro controller unit, the light emitting devices by the switches according to the transmitted information.

[0011] Preferably, a mouse is mostly used as the input device. The keyboard itself can be operated as the input device.

ADVANTAGEOUS EFFECTS

[0012] In accordance with the present invention, the user can apply wanted colors to the target keys.

[0013] The user can improve operational efficiency by increasing visibility of the characters often used in the computer operation using many keys of the keyboard. Also, the user can improve operational efficiency with the customized keyboard by obtaining target color characters by light sources having three primary colors.

[0014] Furthermore, the user can perform the computer operation even in a dark space.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein:

[0016] FIG. 1 illustrates an apparatus for selectively displaying characters of a keyboard disclosed under Korean Patent Registration Official Gazette 10-0222374;

[0017] FIG. 2 illustrates some keys of a keyboard in accordance with the present invention;

[0018] FIG. 3 illustrates one example of the key of the keyboard in accordance with the present invention;

[0019] FIG. 4 illustrates a method of selecting colors of the keys on a monitor in accordance with the present invention;

[0020] FIG. 5 illustrates one example of a physical structure for selecting the colors of the keys in accordance with the present invention; and

[0021] FIG. 6 illustrates a series of processes performed in a driving program.

[0022] The characters expressed in the Greek alphabet of FIGS. 2 to 4 are the substitution of the characters expressed in the Korean alphabet of FIGS. 2 to 4 at the time of the PCT filing, which is for PCT publication.

MODE FOR THE INVENTION

[0023] A keyboard and a method of selecting colors of keys of the same in accordance with the present invention will now be described in detail with reference to the accompanying drawings.

[0024] FIG. 2 illustrates some keys of the keyboard in accordance with the present invention. The keys include red

color keys **1**, blue color keys **2**, green color keys **3**, violet color keys **4** and orange color keys **5**.

[0025] FIG. **3** illustrates one example of the key of the keyboard in accordance with the present invention. A light emitting device **20** having RGB (red, green and blue) diodes is disposed below a key **10**.

[0026] The top surface **30** of the key **10** is formed wholly opaque and a symbol region **40** composed of a character or a mark is formed to transmit light. That is, the key **10** is made of a light transmitting material, and a coating solution **50** is opaquely coated on the top surface **30** or the whole outer surface of the key **10** and removed from the area corresponding to the symbol region **40** by laser processing. Also, the key **10** is formed by double injection so that only the symbol region **40** can transmit light. In addition, the whole key **10** or the top surface **30** of the key **10** may be formed to transmit light, with the symbol region **40** opaque. In the case that a reflecting plate **60** is formed on the inner surface of the key **10** by plating, the reflecting plate **60** can improve efficiency of light emitted to the top surface **30** of the key **10**.

[0027] In the right side of FIG. **3**, the symbol region **40** has a blue color. Such a color can be varied by controlling the light emitted from the light emitting device **20**.

[0028] The method of selecting the colors of the keys of the keyboard in accordance with the present invention will now be described.

[0029] FIG. **4** illustrates the method of selecting the colors of the keys on a monitor in accordance with the present invention. Color selection is carried out by displaying the keys of the keyboard on the screen, designating the color by a color designating window **71**, and selecting the corresponding key **73** by a cursor **72**.

[0030] FIG. **5** illustrates one example of a physical structure for selecting the colors of the keys in accordance with the present invention. The operational principle of the light emitting devices **20** is similar to that of the general LEDs of FIG. **1**.

[0031] In general, the keyboard is controlled by a built-in control IC, namely, a micro controller unit (MCU). Basically, the MCU transmits electric signals generated by mechanical signals of the keys of the keyboard to a computer main body. Besides, the MCU turns on and off the LEDs disposed at the upper portion of the right side of the keyboard for displaying the operation of function keys such as scroll lock and caps lock.

[0032] In order to designate the colors of the keys of the keyboard and emit the designated colors by the light emitting devices disposed below the keys, a driving program **81** for displaying the keys of the keyboard on the screen upon the request of the user as shown in FIG. **4**, enabling the user to designate the colors of the keys, receiving the designated colors, and finally transmitting the colors to the MCU of the keyboard is mounted on a computer **80** as software. A keyboard **90** includes an MCU **91** having switches **92** for controlling the current supplied to the light emitting devices **20**.

[0033] The user requests a color selection mode to the computer **80** through an input device **201** such as a mouse. The computer **80** executes the driving program **81** in response to the request of the user. After color selection, the computer **80** transmits the related information to the MCU **91** of the keyboard **90**. The series of processes of the computer **80** are performed by a CPU **82** of the computer **80**.

[0034] For example, when the user designates the specific key with the red color, the MCU **91** turns off the switches of

the LEDs corresponding to the blue and green colors and turns on the switch of the LED corresponding to the red color to display the key with the red color. In addition, when the user designates the key with the violet color, the MCU **91** turns on the switches of the LEDs corresponding to the blue and red colors, thereby displaying the key with the violet color. In addition, the same color can be displayed with various spectra by controlling the amount of supplied current.

[0035] FIG. **6** illustrates the series of processes performed in the driving program. Whether the color selection request is received from the user is confirmed in an initial stage. If the color selection request is received (S1), the screen for color selection is displayed to the user (S2). The processes of selecting the keys and the colors are consecutively carried out on the screen as shown in FIG. **3** (S3). When the user notifies completion of the selection process (S4), the driving program **81** is ended.

[0036] Although the preferred embodiments of the present invention have been described, it is understood that the present invention should not be limited to these preferred embodiments but various changes and modifications can be made by one skilled in the art within the spirit and scope of the present invention as hereinafter claimed.

1. A keyboard being connected to a computer as an input means and including a plurality of keys each respectively including a symbol region on its top surface, the keyboard comprising:

light emitting devices, each respectively disposed below a key to lighten the top surface of the key; and

a micro controller unit transmitting signals generated by each key to the computer, having switches for controlling the light emitting devices, and controlling switches according to signals transmitted from the computer.

2. The keyboard of claim **1**, wherein each of the light emitting devices comprises at least one of red, green and blue LEDs, and the micro controller unit comprises at least one switch for controlling said at least one of the red, green and blue LEDs.

3. The keyboard of claim **1**, wherein the top surface of the key is formed opaque and the symbol region is formed to transmit light.

4. The keyboard of claim **1**, wherein the top surface of the key is formed to transmit light and the symbol region is formed opaque.

5. The keyboard of claim **1**, wherein a reflecting plate is provided inside of each of the keys.

6. A method of selecting colors of keys of a keyboard, the keyboard being connected to a computer as an input means, and including a plurality of keys each respectively including a symbol region on its top surface, light emitting devices each respectively disposed below a key to lighten the top surface of the key, and a micro controller unit having switches for controlling the light emitting devices, the method comprising:

a first step for receiving a request of selecting the colors of the keys of the keyboard from an input device;

a second step for displaying a screen on a monitor for key selection and color selection of the selected key,

a third step for receiving information on the color-selected key from the input device; and

a fourth step for transmitting the information to the micro controller unit of the keyboard.

7. The method of claim **6**, further comprising a fifth step for controlling, at the micro controller unit, the light emitting devices by the switches according to the transmitted information.

8. The method of claim **6**, wherein the light emitting devices are composed of LEDs.

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